1 INTRODUCTION

Over the last five decades, the U.S. Department of Energy (DOE) has enriched large quantities of uranium for nuclear applications by means of gaseous diffusion. This enrichment has taken place at three DOE sites located at Paducah, Kentucky; Portsmouth, Ohio; and the East Tennessee Technology Park (ETTP, formerly known as the K-25 site) in Oak Ridge, Tennessee (Figure 1-1). "Depleted" uranium hexafluoride (commonly referred to as DUF_6) is a product of this process. It is being stored at the three sites. The total DUF_6 inventory at the three sites weighs approximately 700,000 metric tons (t) (770,000 short tons [tons])[1] and is stored in about 60,000 steel cylinders.

This document is a site-specific environmental impact statement (EIS) for construction and operation of a proposed DUF_6 conversion facility at the Portsmouth site. The proposed facility would convert the DUF_6 stored at Portsmouth and ETTP to a more stable chemical form suitable for use or disposal. A separate EIS (DOE 2004a) evaluates potential impacts for a proposed conversion facility to be constructed at the Paducah site. The EISs have been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) (*United States Code*, Title 42, Section 4321 et seq. [42 USC 4321 et seq.]), Council on Environmental Quality (CEQ) NEPA regulations (*Code of Federal Regulations*, Title 40, Parts 1500–1508 [40 CFR Parts 1500–1508]), and DOE's NEPA implementing procedures (10 CFR Part 1021).

National Environmental Policy Act (NEPA) Regulations

For major federal actions with the potential for significant environmental impacts, NEPA regulations require federal agencies to discuss a proposed action and all reasonable alternatives in an environmental impact statement (EIS). The information in the EIS must be sufficient for reviewers to evaluate the relative merits of each alternative.

The agency must briefly discuss any alternatives that were eliminated from further analysis. The agency should identify its preferred alternatives, if one or more exist, in the draft EIS and must identify its preferred alternative in the final EIS unless another law prohibits naming a preference. After completing the final EIS and in order to implement an alternative, the federal agency must issue a Record of Decision that announces the decision that was made and identifies the alternatives that were considered.

This EIS addresses the potential environmental impacts at the Portsmouth site from the construction, operation, maintenance, and decontamination and decommissioning (D&D) of the proposed conversion facility; from the transportation of the ETTP cylinders to Portsmouth; from the transportation of depleted uranium conversion products to a disposal facility; and from the transportation, sale, use, or disposal of the fluoride-containing conversion products (hydrogen fluoride [HF] or calcium fluoride [CaF_2]). Three alternative locations within the Portsmouth site are evaluated for the

[1] In general, in this EIS, values in English units are presented first, followed by metric units in parentheses. However, when values are routinely reported in metric units, the metric units are presented first, followed by English units in parentheses.

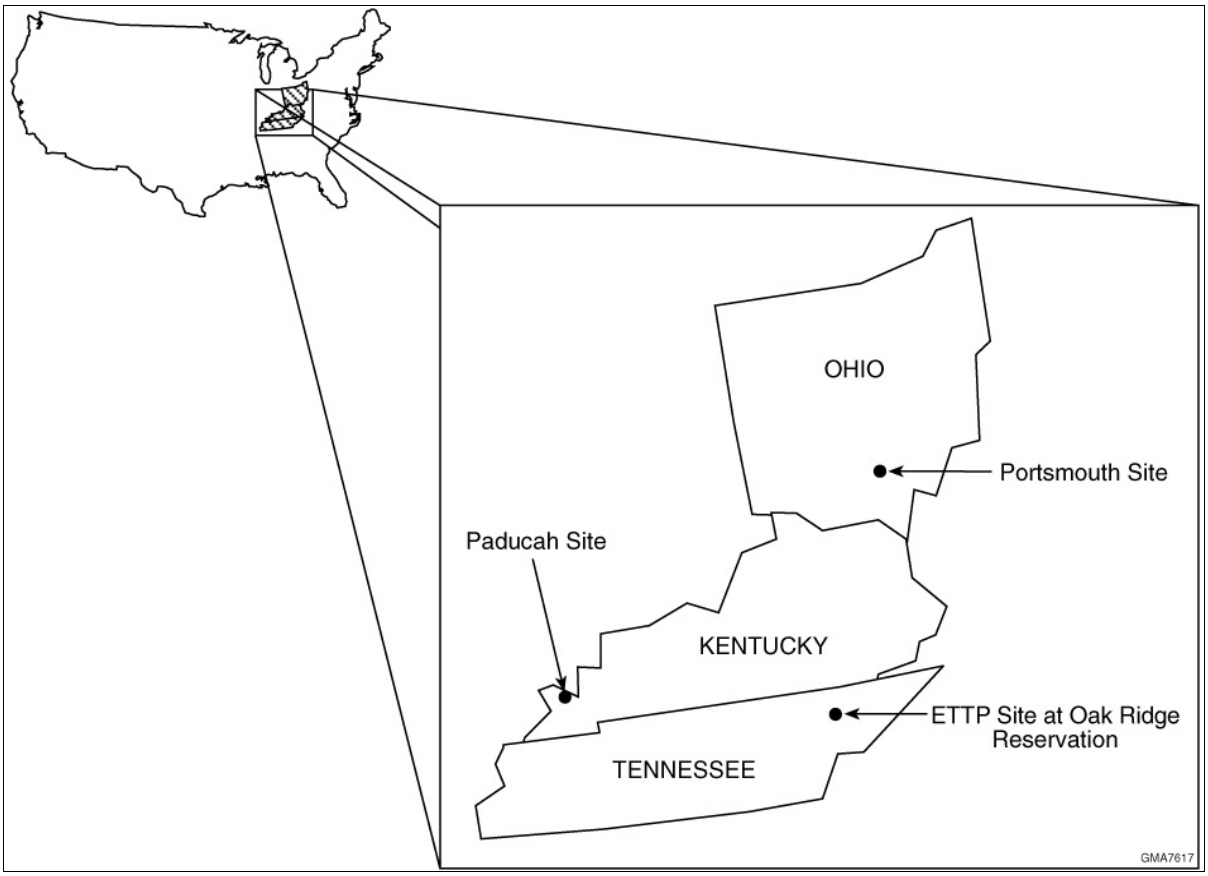

FIGURE 1-1 DUF_6 Storage Locations

conversion facility. An option of shipping the ETTP cylinders to Paducah is also considered, as is an option of expanding facility operations. This EIS also evaluates a no action alternative, which assumes continued storage of DUF_6 in cylinders at the Portsmouth and ETTP sites.

1.1 BACKGROUND INFORMATION

The current DUF_6 conversion facility project is the culmination of a long history of DUF_6 management activities and events. To put the current project into context and provide perspective, this section provides a brief summary of this history. Additional background information on the storage and characteristics of DUF_6 and the DUF_6 cylinder inventory is provided in Section 1.2.

Uranium enrichment in the United States began as part of the atomic bomb development by the Manhattan Project during World War II. Enrichment for both civilian and military uses continued after the war under the auspices of the U.S. Atomic Energy Commission (AEC) and its successor agencies, including DOE. Three large gaseous diffusion plants (GDPs) were constructed to produce enriched uranium, first at the K-25 site (now called ETTP) and subsequently at Paducah and Portsmouth. The K-25 plant ceased operations in 1985, and the

Portsmouth plant ceased operations in 2001. The Paducah GDP continues to operate (see Section 1.1.1).

The DUF_6 produced during enrichment has been stored in large steel cylinders at all three gaseous diffusion plant sites since the 1950s. The cylinders are typically stacked two high and are stored outdoors on concrete or gravel yards. Figure 1.1-1 shows typical arrangements for storing cylinders.

1.1.1 Creation of USEC

In 1993, the U.S. government began the process of privatizing uranium enrichment services by creating the United States Enrichment Corporation (USEC), a wholly owned government corporation, pursuant to the *Energy Policy Act of 1992* (Public Law [P.L.] 102-186). The Paducah and Portsmouth GDPs were leased to USEC, but DOE retained responsibility for storage, maintenance, and disposition of about 46,422 DUF_6 cylinders produced before 1993 and located at the three gaseous diffusion plant sites (28,351 at Paducah, 13,388 at Portsmouth, and 4,683 at K-25). In 1996, the *USEC Privatization Act* (P.L. 104-134) transferred ownership of USEC from the government to private investors. This act provided for the allocation of USEC's liabilities between the U.S. government (including DOE) and the new private corporation, including liabilities for DUF_6 cylinders generated by USEC before privatization.

In May and June of 1998, USEC and DOE signed two memoranda of agreement (MOAs) regarding the allocation of responsibilities for depleted uranium generated by USEC after 1993 (DOE and USEC 1998a,b). The two MOAs transferred ownership of a total of 11,400 DUF_6 cylinders from USEC to DOE.

DUF_6 Management Time Line

1950–1993	DOE generates DUF_6 stored in cylinders at the ETTP, Portsmouth, and Paducah sites.
1985	K-25 (ETTP) GDP ceases operations.
1992	Ohio EPA issues Notice of Violation (NOV) to Portsmouth.
1993	USEC is created by P.L. 102-186.
1994	DOE initiates DUF_6 PEIS.
1995	DNFSB issues Recommendation 95-1, Safety of Cylinders Containing Depleted Uranium. DOE initiates UF_6 Cylinder Project Management Plan.
1996	USEC Privatization Act (P.L. 104-134) is enacted.
1997	DOE issues Draft DUF_6 PEIS.
1998	DOE and Ohio EPA reach agreement on NOV. Two DOE-USEC MOAs transfer 11,400 DUF_6 cylinders to DOE. P.L. 105-204 is enacted.
1999	DOE and TDEC enter consent order. DOE issues Final DUF_6 PEIS. DOE issues conversion plan in response to P.L. 105-204. DNFSB closes Recommendation 95-1. DOE issues Draft RFP for conversion services.
2000	DOE issues Final RFP for conversion services.
2001	DOE receives five proposals in response to RFP. DOE identifies three proposals in competitive range. DOE publishes NOI for site-specific DUF_6 Conversion EIS. DOE prepares environmental critique to support conversion services procurement process. Portsmouth GDP ceases operations. DOE holds public scoping meetings for the site-specific DUF_6 Conversion EIS.
2002	DOE-USEC agreement transfers 23,000 t (25,684 tons) of DUF_6 to DOE. P.L. 107-206 is enacted. DOE awards conversion services contract to UDS. DOE prepares environmental synopsis to support conversion services procurement process.
2003	DOE announces Notice of Change in NEPA Compliance Approach and issues the draft EIS. DOE issues draft site-specific conversion facility EISs.
2004	Final site-specific conversion facility EISs issued.

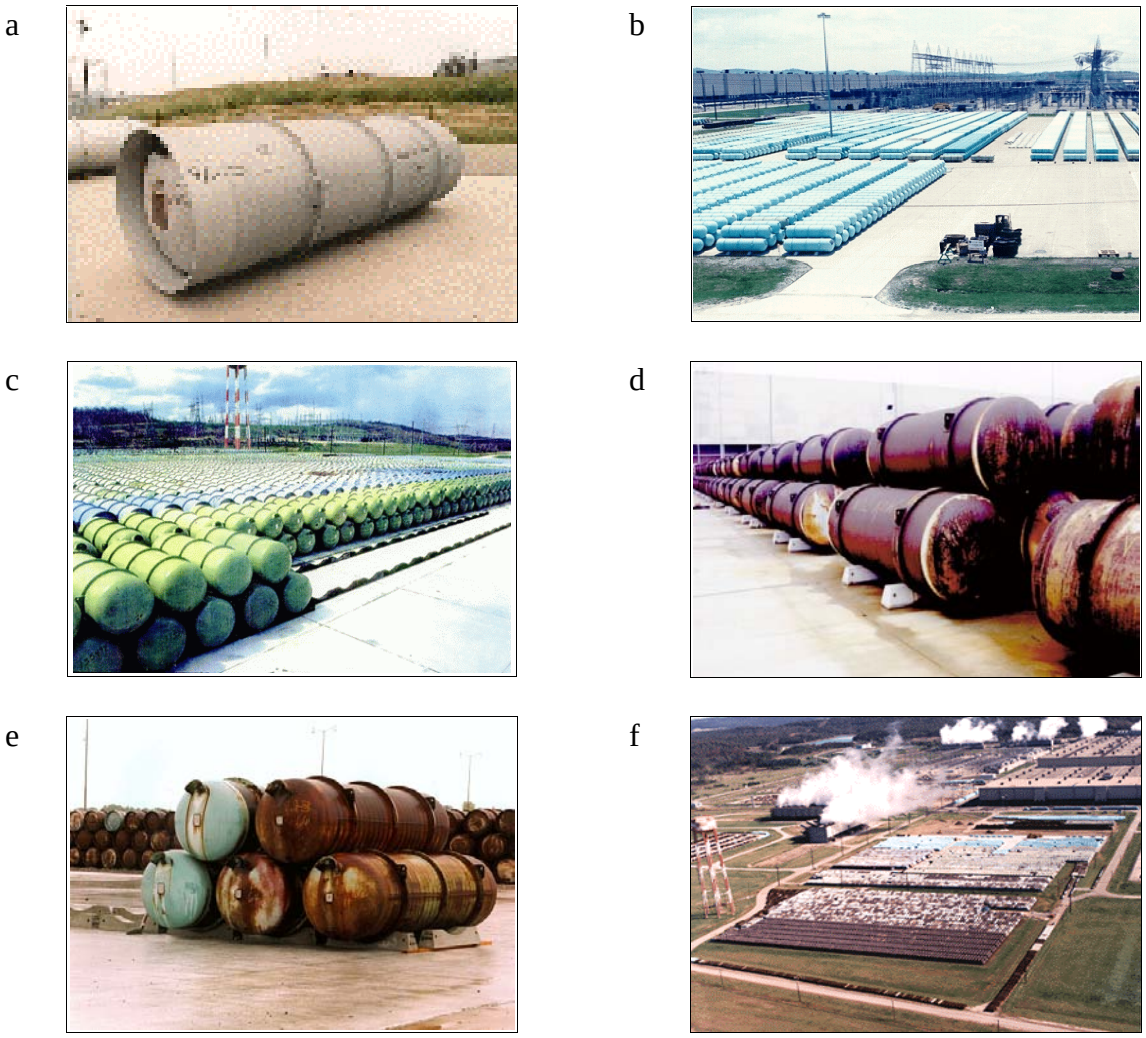

FIGURE 1.1-1 Storage of DUF_6 Cylinders: (a) Typical 14-ton (12-t) skirted cylinder. (b) New cylinder storage yard at the Paducah site. (c, d, e) Cylinders stacked two high on concrete chocks. (f) Cylinder yards at the Portsmouth site.

On June 17, 2002, DOE and USEC signed a third agreement (DOE and USEC 2002) to transfer up to 23,300 t (25,684 tons) of DUF_6 from USEC to DOE between 2002 and 2006. The exact number of cylinders was not specified. Transfer of ownership of all the material will take place at Paducah. While title to the DUF_6 is transferred to DOE under this agreement, custody and cylinder management responsibility remains with USEC until DOE requests that USEC deliver the cylinders for processing in the conversion facility.

1.1.2 Growing Concern over the DUF_6 Inventory

In May 1995, the Defense Nuclear Facilities Safety Board (DNFSB), an independent DOE oversight organization within the Executive Branch, issued Recommendation 95-1 regarding storage of the DUF_6 cylinders. This document advised that DOE should take three

actions: (1) start an early program to renew the protective coating on cylinders containing DUF_6 from the historical production of enriched uranium, (2) explore the possibility of additional measures to protect the cylinders from the damaging effects of exposure to the elements as well as any additional handling that might be called for, and (3) institute a study to determine whether a more suitable chemical form should be selected for long-term storage of depleted uranium.

In response to Recommendation 95-1, DOE began an aggressive effort to better manage its DUF_6 cylinders, known as the *UF_6 Cylinder Project Management Plan* (Lockheed Martin Energy Systems, Inc. [LMES] 1997a). This plan incorporated more rigorous and more frequent inspections, a multiyear schedule for painting and refurbishing cylinders, and construction of concrete-pad cylinder yards. In December 1999, the DNFSB determined that DOE's implementation of the *UF_6 Cylinder Project Management Plan* was successful, and, as a result, on December 16, 1999, it closed Recommendation 95-1.

Several affected states also expressed concern over the DOE DUF_6 inventory. In October 1992, the Ohio Environmental Protection Agency (OEPA) issued a Notice of Violation (NOV) alleging that DUF_6 stored at the Portsmouth facility is subject to regulation under state hazardous waste laws. The NOV stated that the OEPA had determined DUF_6 to be a solid waste and that DOE had violated Ohio laws and regulations by not evaluating whether such waste was hazardous. DOE disagreed with this assessment and entered into discussions with the OEPA that continued through February 1998, when an agreement was reached. Ultimately, in February 1998, DOE and the OEPA agreed to set aside the issue of whether the DUF_6 is subject to state hazardous waste regulation and instituted a negotiated management plan governing the storage of the Portsmouth DUF_6. The agreement also requires DOE to continue its efforts to evaluate the potential use or reuse of the material. The agreement expires in 2008.

Similarly, in February 1999, DOE and the Tennessee Department of Environment and Conservation (TDEC) entered into a consent order that included a requirement for the performance of two environmentally beneficial projects: the implementation of a negotiated management plan governing the storage of the small inventory (relative to other sites) of all UF_6 (depleted, enriched, and natural) cylinders stored at the ETTP site and the removal of the DUF_6 from the ETTP site or the conversion of the material by December 31, 2009. The consent order further requires DOE to submit a plan, within 60 days of completing NEPA review of its long-term DUF_6 management strategy, that contains schedules for activities related to removal of cylinders from the ETTP site.

In Kentucky, a final Agreed Order between DOE and the Kentucky Natural Resources and Environmental Protection Cabinet concerning DUF_6 cylinder management was entered in October 2003. This Agreed Order requires that DOE provide the Kentucky Department of Environmental Protection with an inventory of all DUF_6 cylinders for which DOE has management responsibility at the Paducah site and, with regard to that inventory, that DOE implement the DUF_6 Cylinder Management Plan, which is Attachment 1 to the Agreed Order.

1.1.3 Programmatic NEPA Review and Congressional Interest

In 1994, DOE began work on a *Programmatic Environmental Impact Statement for Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride* (DUF_6 PEIS) (DOE 1999a) (DOE/EIS-0269) to evaluate potential broad management options for DOE's DUF_6 inventory. Alternatives considered included continued storage of DUF_6 in cylinders at the gaseous diffusion plant sites or at a consolidated site, and the use of technologies for converting the DUF_6 to a more stable chemical form for long-term storage, use, or disposal. DOE issued the draft DUF_6 PEIS for public review and comment in December 1997 and held hearings near each of the three sites where DUF_6 is currently stored (Paducah, Kentucky; Oak Ridge, Tennessee; and Portsmouth, Ohio) and in Washington, D.C. In response to its efforts, DOE received some 600 comments.

In July 1998, while the PEIS was being prepared, the President signed into law P.L. 105-204. The text of P.L. 105-204 pertinent to the management of DUF_6 is as follows:

> *(a) PLAN. – The Secretary of Energy shall prepare, and the President shall include in the budget request for fiscal year 2000, a Plan and proposed legislation to ensure that all amounts accrued on the books of the United States Enrichment Corporation for the disposition of depleted uranium hexafluoride will be used to commence construction of, not later than January 31, 2004, and to operate, an onsite facility at each of the gaseous diffusion plants at Paducah, Kentucky, and Portsmouth, Ohio, to treat and recycle depleted uranium hexafluoride consistent with the National Environmental Policy Act.*

DOE began, therefore, to prepare a responsive plan while it proceeded with the PEIS.

On March 12, 1999, DOE submitted the plan to Congress; no legislation was proposed. In April 1999, DOE issued the final DUF_6 PEIS. The PEIS identified conversion of DUF_6 to another chemical form for use or long-term storage as part of the preferred management alternative. In the Record of Decision (ROD; *Federal Register*, Volume 64, page 43358 [64 FR 43358]), DOE decided to promptly convert the DUF_6 inventory to a more stable uranium oxide form (DOE 1999b). DOE also stated that it would use the depleted uranium oxide as much as possible and store the remaining depleted uranium oxide for potential future uses or disposal, as necessary. In addition, DUF_6 would be converted to depleted uranium metal only if uses for metal were available. DOE did not select a specific site or sites for the conversion facilities but reserved that decision for subsequent NEPA review. (This EIS is that site-specific review.)

Then, in July 1999, DOE issued the *Final Plan for the Conversion of Depleted Uranium Hexafluoride as Required by Public Law 105-204* (DOE 1999c). The Conversion Plan describes the steps that would allow DOE to convert the DUF_6 inventory to a more stable chemical form. It incorporates information received from the private sector in response to a DOE request for expressions of interest; ideas from members of the affected communities, Congress, and other interested stakeholders; and the results of the analyses for the final DUF_6 PEIS. The Conversion

Plan describes DOE's intent to chemically process the DUF_6 to create products that would present a lower long-term storage hazard and provide a material suitable for use or disposal.

1.1.4 DOE Request for Contractor Proposals and Site-Specific NEPA Review

DOE initiated the final Conversion Plan on July 30, 1999, and announced the availability of a draft Request for Proposals (RFP) for a contractor to design, construct, and operate DUF_6 conversion facilities at the Paducah and Portsmouth sites.

In early 2000, the RFP was modified to allow for a wider range of potential conversion product forms and process technologies than had been previously reviewed in the DUF_6 PEIS (the PEIS considered conversion to triuranium octaoxide [U_3O_8] and uranium dioxide [UO_2] for disposal and conversion to uranium metal for use). DOE stated that, if the selected conversion technology would generate a previously unconsidered product (e.g., depleted uranium tetrafluoride [UF_4]), DOE would review the potential environmental impacts as part of the site-specific NEPA review.

On October 31, 2000, DOE issued a final RFP to procure a contractor to design, construct, and operate DUF_6 conversion facilities at the Paducah and Portsmouth sites. The RFP stated that any conversion facilities that would be built would have to convert the DUF_6 within a 25-year period to a more stable chemical form that would be suitable for either beneficial use or disposal. The selected contractor would use its proposed technology to design, construct, and operate the conversion facilities for an initial 5-year period. Operation would include (1) maintaining the DUF_6 inventories and conversion product inventories; (2) transporting all UF_6 storage cylinders currently located at ETTP to a conversion facility at the Portsmouth site, as appropriate; and (3) transporting to an appropriate disposal site any conversion product for which no use was found. The selected contractor would also be responsible for preparing such excess material for disposal.

In March 2001, DOE announced the receipt of five proposals in response to the RFP, three of which proposed conversion to U_3O_8 and two of which proposed conversion to UF_4. In August 2001, DOE deemed three of these proposals to be within the competitive range; two conversion to U_3O_8 proposals and one conversion to UF_4 proposal.

On September 18, 2001, DOE published a Notice of Intent (NOI) in the *Federal Register* (66 FR 48123) announcing its intention to prepare an EIS for the proposed action to construct, operate, maintain, and decontaminate and decommission two DUF_6 conversion facilities at Portsmouth, Ohio, and Paducah, Kentucky. DOE held three scoping meetings to provide the public with an opportunity to present comments on the scope of the EIS and to ask questions and discuss concerns with DOE officials regarding the EIS. The scoping meetings were held in Piketon, Ohio, on November 28, 2001; in Oak Ridge, Tennessee, on December 4, 2001; and in Paducah, Kentucky, on December 6, 2001.

The alternatives identified in the NOI included a two-plant alternative (one at the Paducah site and another at the Portsmouth site), a one-plant alternative (only one plant would be

built, at either the Paducah or the Portsmouth site), an alternative using existing UF_6 conversion capacity at commercial nuclear fuel fabrication facilities, and a no action alternative. For alternatives that involved constructing one or two new plants, DOE planned to consider alternative conversion technologies, local siting alternatives within the Paducah and Portsmouth site boundaries, and the shipment of DUF_6 cylinders stored at ETTP to either the Portsmouth site or to the Paducah site. The technologies to be considered in the EIS were those submitted in response to the October 2000 RFP, plus any other technologies that DOE believed must be considered.

1.1.5 Public Law 107-206 Passed by Congress

During the site-specific NEPA review process, Congress acted again regarding DUF_6 management, and on August 2, 2002, the President signed the *2002 Supplemental Appropriations Act for Further Recovery from and Response to Terrorist Attacks on the United States* (P.L. 107-206). The pertinent part of P.L. 107-206 had several requirements: that no later than 30 days after enactment, DOE must select for award of a contract for the scope of work described in the October 2000 RFP, including design, construction, and operation of a DUF_6 conversion facility at each of the Department's Paducah, Kentucky, and Portsmouth, Ohio, gaseous diffusion sites; that the contract require groundbreaking for construction to occur no later than July 31, 2004; that the contract require construction to proceed expeditiously thereafter; that the contract include as an item of performance the transportation, conversion, and disposition of DU contained in cylinders located at ETTP, consistent with environmental agreements between the state of Tennessee and the Secretary of Energy; and that no later than 5 days after the date of groundbreaking for each facility, the Secretary of Energy shall submit to Congress a certification that groundbreaking has occurred. The relevant portions of the Appropriations Act are set forth in Appendix A.

In response to P.L. 107-206, on August 29, 2002, DOE awarded a contract to Uranium Disposition Services, LLC (hereafter referred to as UDS) for construction and operation of two conversion facilities. DOE also reevaluated the appropriate scope of its site-specific NEPA review and decided to prepare two separate EISs, one for the plant proposed for the Paducah site and a second for the Portsmouth site. This change was announced in the *Federal Register* Notice of Change in NEPA Compliance Approach published on April 28, 2003 (68 FR 22368).

The two draft site-specific conversion facility EISs were mailed to stakeholders in late November 2003, and a notice of availability was published by the EPA in the *Federal Register* on November 28, 2003 (68 FR 66824). Comments on the draft EISs were accepted during a 67-day review period, from November 28, 2003, until February 2, 2004. Public hearings on the draft EISs were held near Portsmouth, Ohio, on January 7, 2004; Paducah, Kentucky, on January 13, 2004; and Oak Ridge, Tennessee, on January 15, 2004. (Section 1.6.3 provides additional information on the public review of the draft EISs).

1.2 CHARACTERISTICS OF DUF_6

DUF_6 results from the process of making uranium suitable for use as fuel in nuclear reactors or for military applications. The use of uranium in these applications requires that the proportion of the uranium-235 isotope found in natural uranium, which is approximately 0.7% by weight (wt%), be increased through an isotopic separation process. To achieve this increase, a uranium-235 enrichment process called gaseous diffusion is used in the United States. The gaseous diffusion process uses uranium in the form of UF_6, primarily because UF_6 can conveniently be used in gaseous form for processing, in liquid form for filling or emptying containers, and in solid form for storage. Solid UF_6 is a white, dense, crystalline material that resembles rock salt.

Depleted uranium is uranium that, through the enrichment process, has been stripped of a portion of the uranium-235 that it once contained so that its proportion is lower than the 0.7 wt% found in nature. The uranium in most of DOE's DUF_6 has between 0.2 wt% and 0.4 wt% uranium-235.

The chemical and physical characteristics of DUF_6 pose potential health risks, and the material is handled accordingly. Uranium and its decay products in DUF_6 emit low levels of alpha, beta, gamma, and neutron radiation. The radiation levels measured on the outside surface of filled DUF_6 storage cylinders are typically about 2 to 3 millirem per hour (mrem/h), decreasing to about 1 mrem/h at a distance of 1 ft (0.3 m). If DUF_6 is released to the atmosphere, it reacts with water vapor in air to form HF and a uranium oxyfluoride compound called uranyl fluoride (UO_2F_2), which can be harmful to human health if inhaled or ingested in sufficient quantities. Uranium is a heavy metal that, in addition to being radioactive, can have harmful chemical effects (primarily on the kidneys) if it enters the bloodstream by means of ingestion or inhalation. HF is an extremely corrosive gas that can

Cylinder-Related Terms Used in This EIS

Types of UF_6

UF_6	A chemical composed of one atom of uranium combined with six atoms of fluorine. UF_6 is a volatile white crystalline solid at ambient conditions.
Normal UF_6	UF_6 made with uranium that contains the isotope uranium-235 at a concentration equal to that found in nature, that is, 0.7% uranium-235.
DUF_6	UF_6 made with uranium that contains the isotope uranium-235 in concentrations less than the 0.7% found in nature. In general, the DOE DUF_6 contains between 0.2% and 0.4% uranium-235.
Enriched UF_6	UF_6 made with uranium containing more than 0.7% uranium-235. In general, DOE enriched UF_6 considered in this EIS contains less than 5% uranium-235.
Reprocessed UF_6	UF_6 made with uranium that was previously irradiated in a nuclear reactor and chemically separated during reprocessing.

Types of Cylinders

Full DUF_6	Cylinders filled to 62% of their volume with DUF_6 (some cylinders are slightly overfilled).
Partially full	Cylinders that contain more than 50 lb (23 kg) of DUF_6 but less than 62% of their volume.
Heel	Cylinders that contain less than 50 lb (23 kg) of residual nonvolatile material left after the DUF_6 has been removed.
Empty	Cylinders that have had the DUF_6 and heel material removed and contain essentially no residual material.
Feed	Cylinders used to supply UF_6 into the enrichment process. Most feed cylinders contain natural UF_6, although some historically contained reprocessed UF_6.
Non-DUF_6	A term used in this EIS to refer to cylinders that contain enriched UF_6 or normal UF_6.

damage the lungs and cause death if inhaled at high enough concentrations. In light of such characteristics, DOE stores DUF_6 in a manner designed to minimize the risk to workers, the public, and the environment.

DUF_6 has been stored at all three storage sites since the 1950s in large steel cylinders. Several different cylinder types are in use, although the vast majority of cylinders have a 14-ton (12-t) capacity. (Typical cylinders in storage are shown in Figure 1.1-1.) The cylinders with a 14-ton (12-t) capacity are 12 ft (3.7 m) long by 4 ft (1.2 m) in diameter; most have a steel wall that is 5/16 in. (0.79 cm) thick. The cylinders have external stiffening rings that provide support. Lifting lugs for handling are attached to the stiffening rings. A small percentage of the cylinders have skirted ends (extensions of the cylinder walls past the rounded ends of the cylinder), as shown in Figure 1.1-1. Each cylinder has a single valve for filling and emptying located on one end at the 12 o'clock position. Similar but slightly smaller cylinders with a capacity of 10 tons (9 t) are also in use. Most of the cylinders were manufactured in accordance with an American National Standards Institute standard (ANSI N14.1, *American National Standard for Nuclear Materials — Uranium Hexafluoride — Packaging for Transport*) as specified in 49 CFR 173.420, the federal regulations governing transport of DUF_6.

1.2.1 Cylinder Inventory

This EIS considers conversion of the DUF_6 inventory stored at the Portsmouth site for which DOE has management responsibility, as well as conversion of the DUF_6 stored at ETTP after it has been shipped to Portsmouth. Statistics on the cylinders managed by DOE at the Portsmouth and ETTP sites as of January 26, 2004, are summarized in Table 1.1-1. The EIS considers the conversion of about 21,000 cylinders containing 250,000 t (275,000 tons) of DUF_6. In addition, this EIS considers the transportation to Portsmouth of about 1,100 cylinders from ETTP that contain enriched UF_6 or normal UF_6 (collectively called "non-DUF_6" cylinders in this EIS) or are empty. The management of these non-DUF_6 cylinders, along with the non-DUF_6 cylinders currently at Portsmouth, is also included; however, they would not be processed in the conversion facility.

The conversion facility proposed for Portsmouth is designed to convert 13,500 t (14,881 tons) of DUF_6 per year (approximately 1,000 cylinders per year). At that rate of throughput, it will take approximately 18 years to convert the Portsmouth and ETTP cylinder inventories.

In addition to the Portsmouth and ETTP inventories, approximately 36,200 cylinders are managed at the Paducah site. Construction and operation of a conversion facility at the Paducah site for conversion of the Paducah inventory is the subject of a separate EIS (DOE 2004a).

As shown in Table 1.1-1, the total number of non-DUF_6 cylinders is 2,693 at Portsmouth and 1,102 at ETTP. The non-DUF_6 cylinders contain a total of approximately 13,545 t (14,900 tons) of UF_6 (26 t [29 tons] of enriched UF_6 plus 13,519 t [14,871 tons] of normal UF_6) (Hightower 2004). Nearly 100% of the Portsmouth enriched UF_6 and over 98% of the ETTP

TABLE 1.1-1 Inventory of DOE UF_6 Cylinders Considered in This EIS[a]

Location	No. of Cylinders	Weight of UF_6 (t)
Portsmouth – DUF_6	16,109	195,800
Non-DUF_6		
Enriched UF_6	1,444	19
Normal UF_6	1,249	13,500
Empty	485	0
ETTP[b] – DUF_6	4,822	54,300
Non-DUF_6		
Enriched UF_6	881	7
Normal UF_6	221	19
Empty	20	0
Total		
DUF_6	20,931	250,100
Non-DUF_6	3,795	13,544
Empty	505	0

[a] As of January 26, 2004 (Hightower 2004).

[b] The proposed action calls for shipment of the ETTP cylinders to Portsmouth.

enriched UF_6 contains less than 5% uranium-235. This EIS considers the shipment of the ETTP non-DUF_6 cylinders to Portsmouth. It is assumed that the normal UF_6 and enriched UF_6 from both sites would be put to beneficial uses; therefore, conversion of the contents of the non-DUF_6 cylinders is not considered.

Although the current proposal is to ship all the cylinders at ETTP to Portsmouth, this EIS does consider an option of shipping the ETTP cylinders to Paducah. If the ETTP cylinders were shipped to Paducah, the Portsmouth conversion facility would operate for approximately 14 years rather than 18 to convert the DUF_6 cylinders.

The evaluation of the no action alternative in this EIS is based on the assessment conducted for the PEIS, which was revised to reflect updated information. To account for uncertainties related to the amount of USEC-generated DUF_6 to be managed in the future, the PEIS analysis used for this EIS assumed that a total of approximately 16,400 DUF_6 cylinders at the Portsmouth site would need to be managed.

Several reasonably foreseeable activities could potentially result in a future increase in the number of DUF_6 cylinders for which DOE has management responsibility. These include potential transfers of DUF_6 to DOE from continued USEC gaseous diffusion plant operations at Paducah; from a future USEC advanced enrichment technology plant at Portsmouth, Paducah, or elsewhere; and from some unspecified future commercial uranium enrichment facility licensed and operated in the United States. Such an inventory increase could result in a future decision to

extend conversion facility operations or expand throughput at one or both of the conversion facility sites. An option of expanding operations at the conversion facility is considered in the EIS, as discussed in detail in Section 2.2.7 and in the assessment of impacts presented in Chapter 5.

1.2.2 Cylinder Condition and Potential Contamination

As the inventory of DUF_6 cylinders ages, some cylinders have begun to show evidence of external corrosion. As of August 2002, at all three storage sites combined, 11 cylinders had developed holes (breaches) (see text box). The majority of these breaches were the result of handling damage during stacking or handling damage followed by corrosion. Only 2 of 11 breaches are believed to have resulted from corrosion alone. At Portsmouth, a total of three cylinder breaches have occurred. Five breaches have occurred at ETTP. (The remaining three breaches have occurred at Paducah.) However, since DUF_6 is solid at ambient temperatures and pressures, it is not readily released after a cylinder leak or breach. When a cylinder is breached, moist air reacts with the exposed solid DUF_6 and iron, forming a dense plug of solid uranium and iron compounds and a small amount of HF gas. The plug limits the amount of material released from a breached cylinder. When a cylinder breach is identified, the cylinder is typically repaired or its contents are transferred to a new cylinder.

Because reprocessed uranium was enriched in the early years of gaseous diffusion, some of the DUF_6 inventory is contaminated with small amounts of technetium (Tc) and the transuranic (TRU)

Summary Data for Breached Cylinders at the Storage Sites through 2003

Portsmouth Site, three breached cylinders: Two identified in 1990 were initiated by mechanical damage during stacking; the damage was not noticed immediately, and subsequent corrosion occurred at the point of damage. The largest breach size was about 9 in. × 18 in. (23 cm × 46 cm); the estimated mass of DUF_6 lost was between 17 and 109 lb (7.7 and 49 kg). The next largest cylinder breach had an area of about 2 in. (5.1 cm) in diameter; the estimated DUF_6 lost was less than 4 lb (1.8 kg). The third breached cylinder occurred in 1996 and was the result of handling equipment knocking off a cylinder plug.

ETTP Site, five breached cylinders: Four were identified in 1991 and 1992. Two of these were initiated by mechanical damage during stacking, and two were caused by external corrosion due to prolonged ground contact. The breach areas for these four cylinders were about 2 in. (5.1 cm), 6 in. (15 cm), and 10 in. (25 cm) in diameter for three circular breaches, and 17 in. × 12 in. for a rectangular-shaped breach. The mass of material loss from the cylinders could not be estimated because equipment to weigh the cylinders was not available at the ETTP site. The fifth breach occurred in 1998 and was caused by steel grit blasting, which resulted in a breach at the location of an as-fabricated weld defect (immediately repaired without loss of DUF_6).

Paducah Site, three breached cylinders: One identified in 1992 was initiated by mechanical damage during stacking. The breached area was about 0.06 in. × 2 in. (0.16 cm × 5.1 cm). Estimated material loss was 0. The other two cylinder breaches were identified as breached because of missing cylinder plugs; they were identified between 1998 and 2002. Material loss from these cylinders was not estimated.

elements plutonium (Pu), neptunium (Np), and americium (Am). In 2000, DOE, on the basis of existing process knowledge and results from additional sampling of cylinders, characterized the TRU and Tc contamination in the DUF_6 cylinders. As indicated in a report by Oak Ridge National Laboratory (ORNL) (Hightower et al. 2000), nondetectable or very low levels of TRU elements were found to be dispersed in the DUF_6 stored in the cylinders. However, higher levels of TRU elements, associated with the "heels" remaining in a small number of cylinders formerly used to store reprocessed uranium, are expected to occur. (The term "heel" refers to the residual amount of nonvolatile material left in a cylinder following removal of the DUF_6, typically less than 50 lb [23 kg].) The final RFP for providing conversion services concluded that any DUF_6 contaminated with TRU elements and Tc at the concentrations expected to be encountered could be safely handled in a conversion facility. The data and assumptions used in this EIS to evaluate potential impacts from the DUF_6 contaminated with Tc and TRU elements are described in Appendix B.

Some of the cylinders manufactured before 1978 were painted with coatings containing polychlorinated biphenyls (PCBs). (Although PCBs are no longer in production in the United States, from the 1950s to the late 1970s, PCBs were added to some paints as fungicides and to increase durability and flexibility.) The long persistence of PCBs in the environment and the tendency for bioaccumulation in the foodchain has resulted in regulations to prevent their release and distribution in the environment. As a result, the cylinders with PCB-containing coatings may require special measures during transport, such as bagging, to ensure that PCB-containing paint chips are not released. Additionally, environmental monitoring and maintenance of cylinder storage and process areas may be required to ensure that PCBs are not released during storage or processing. Potential issues associated with PCB-containing cylinder coatings are discussed in Appendix B. As discussed in Appendix B, the presence of PCBs in the coatings of some cylinders is not expected to result in health and safety risks to workers or the public.

1.3 PURPOSE AND NEED

DOE needs to convert its inventory of DUF_6 to a more stable chemical form for use or disposal. This need follows directly from (1) the decision presented in the August 1999 ROD for the PEIS, namely, to begin conversion of the DUF_6 inventory as soon as possible, and (2) P.L. 107-206, which directs DOE to award a contract for construction and operation of conversion facilities at both the Paducah site and the Portsmouth site.

1.4 PROPOSED ACTION

The proposed action evaluated in this EIS is to construct and operate a conversion facility at the Portsmouth site for conversion of the Portsmouth and ETTP DUF_6 inventories into depleted uranium oxide (primarily U_3O_8) and other conversion products. The proposed action includes the shipment of DUF_6 and non-DUF_6 cylinders from the ETTP site to Portsmouth and the construction of a new cylinder storage pad at Portsmouth for the ETTP cylinders, if required. The time period considered is a construction period of approximately 2 years, an operational period of 18 years, and a 3-year period for D&D of the facility.

This EIS assesses the potential environmental impacts from the following proposed activities:

- Construction, operation, maintenance, and D&D of the proposed DUF_6 conversion facility at the Portsmouth site;
- Transportation of DUF_6 cylinders from ETTP to Portsmouth for conversion, as well as transportation of the non-DUF_6 cylinders from ETTP to Portsmouth;
- Construction of a new cylinder storage yard (if required) for ETTP cylinders;
- Transportation of uranium conversion products and waste materials to a disposal facility;
- Transportation and sale of the HF produced as a co-product of conversion; and
- Neutralization of HF to CaF_2 and its sale or disposal in the event that the HF product is not sold.

Three alternative locations for the conversion facility within the Portsmouth site are considered. In addition, this EIS includes an evaluation of the impacts that would result from a no action alternative (i.e., continued DUF_6 cylinder storage at the Portsmouth and ETTP sites).

1.5 DOE DUF_6 MANAGEMENT PROGRAM

In fiscal year (FY) 2001, the responsibility for all uranium program activities was transferred from DOE's Office of Nuclear Energy, Science, and Technology (NE) to its Office of Environmental Management (EM). All activities related to this program are managed by DOE's Lexington Office. The uranium program supports important government activities associated with the federal enrichment program that were not transferred to USEC under the provisions of the National Energy Policy Act of 1992 (P.L. 102-486), including management of highly enriched uranium; management of the facilities at the Paducah and Portsmouth sites; responsibility for preexisting liabilities; management of DOE's inventories of DUF_6 and other surplus uranium; and oversight of the construction of DUF_6 conversion facilities.

Within the uranium program is DOE's DUF_6 management program, whose mission is to safely and efficiently manage DOE's inventory of DUF_6 in a way that protects the health and safety of workers and the public and protects the environment until the DUF_6 is either used or disposed of. In addition to the conversion activities that are the subject of this EIS, the DUF_6 management program involves two other primary activities: (1) surveillance and maintenance of cylinders and (2) development of beneficial uses for depleted uranium.

Since it may take 25 years to convert the DUF_6 in the inventory to a more stable chemical form, DOE intends to ensure the continued surveillance and maintenance of the DUF_6 cylinders

currently in storage. Day-to-day management includes actions designed to cost-effectively improve cylinder storage conditions, such as:

- Performing regular inspections and general maintenance of cylinders and storage yards, including:
    - Restacking and respacing the cylinders to improve drainage and allow for more thorough inspections,
    - Repainting cylinder bodies and the ends of skirted cylinders as needed to arrest corrosion, and
    - Constructing new concrete cylinder storage yards and reconditioning existing yards from gravel to concrete to improve storage conditions.
- Performing routine cylinder valve surveys and maintenance.

DOE is committed to exploring the safe, beneficial use of depleted uranium and other materials that result from the conversion of DUF_6 (e.g., HF and empty carbon steel cylinders) in order to conserve more resources and increase savings over levels achieved through disposal. Accordingly, a DOE research and development (R&D) program on uses for depleted uranium has been initiated. This program is exploring the risks and benefits associated with several uses for depleted uranium, such as a radiation shielding material, a catalyst, and a semiconductor material in electronic devices. More information about DOE's R&D on depleted uranium uses is available on the *Depleted UF_6 Management Program Information Network* Web site (http://web.ead.anl.gov/uranium). In addition, in the RFP for conversion services, DOE requested that the bidders investigate and propose viable uses for the conversion products.

1.6 SCOPE

The scope of an EIS refers to the range of actions, alternatives, and impacts it considers. An agency generally determines the scope of an EIS through a two-part process: internal scoping and public scoping. Internal scoping refers to the agency's efforts to identify potential alternatives and important issues and to determine which analyses to include in an EIS. Public scoping refers to the agency's request for public comments on the proposed action and on the results from its internal scoping. It involves consultations with federal, state, and local agencies as well as requests for comments from stakeholder organizations and members of the general public. The EIS scoping process provides a means for the public to provide input into the decision-making process. DOE is committed to ensuring that the public has ample opportunity to participate in the review. This section summarizes the public scoping conducted for this EIS (Section 1.6.1), discusses the range of issues and alternatives that resulted from the internal and public scoping process (Section 1.6.2), and summarizes the public review of the draft EIS (Section 1.6.3).

1.6.1 Public Scoping Process for This Environmental Impact Statement

On September 18, 2001, DOE published a NOI in the *Federal Register* (66 FR 48123) announcing its intention to prepare an EIS for a proposal to construct, operate, maintain, and decontaminate and decommission DUF_6 conversion facilities at Portsmouth, Ohio, and/or Paducah, Kentucky. The purpose of the NOI was to encourage early public involvement in the EIS process and to solicit public comments on the proposed scope of the EIS, including the issues and alternatives it would analyze. To facilitate public comments, the NOI included a detailed discussion of the project background, a list of the preliminary alternatives and environmental impacts that DOE proposed to evaluate in the EIS, and a project schedule. The NOI announced that the scoping period for the EIS would be open until November 26, 2001. The scoping period was later extended to January 11, 2002.

During the scoping process, the public was given six ways to submit comments on the DUF_6 proposal to DOE:

1. Attendance at public scoping meetings held in Piketon, Ohio; Oak Ridge, Tennessee; and Paducah, Kentucky;

2. Traditional mail delivery;

3. Toll-free facsimile transmission;

4. Toll-free voice message;

5. Electronic mail; and

6. Directly through the *Depleted UF_6 Management Information Network* Web site on the Internet (http://web.ead.anl.gov/uranium).

Numerous ways to communicate about issues and submit comments were provided to encourage maximum participation. All comments, regardless of how they were submitted, received equal consideration.

A total of approximately 100 individuals attended the three scoping meetings, and 20 of these individuals provided oral comments. Individuals in attendance included federal officials, state regulators, local officials, site oversight committee members, representatives of interested companies, members of local media, and private individuals. In addition, about 20 individuals and organizations provided comments through the other means available (fax, telephone, mail, e-mail, and Web site). Some of the comments received through these other means were duplicates of comments made at the scoping meetings. During the scoping period (September 18, 2001, through January 11, 2002), the *Depleted UF_6 Management Information Network* Web site was used a great deal; a total of 64,366 pages were viewed (averaging 554 per day) during 9,983 user sessions (averaging 85 per day) by 4,784 unique visitors.

Approximately 140 comments were received from about 30 individuals and organizations during the scoping period. Appendix C of this EIS provides a summary of these comments. These comments were examined to finalize the proposed scope of this EIS. Comments were related primarily to five major issues: (1) DOE policy; (2) alternatives; (3) cylinder inventory, maintenance, and surveillance; (4) transportation; and (5) general environmental concerns.

Most of the comments made during the public scoping period were related to issues that DOE was already planning to discuss in this EIS. Such comments helped to clarify the need for addressing those issues. However, a few issues were raised that DOE was not able to address in this EIS. These issues and the reasons why they are not addressed are summarized below.

- A request was made to clean up the Portsmouth site before building another facility there. Activities related to remediation of the site are considered in the cumulative impacts section of this EIS. However, waiting until all remediation activities have been completed to start construction of the conversion facility would not be consistent with the requirements of P.L. 107-206.

- One commentor stated that DOE should not consider any alternatives other than the two conversion plants alternative because Congress had mandated that two plants be built: one at Paducah and one at Portsmouth. NEPA requires that the no action alternative be one of the alternatives considered. Therefore, the no action alternative has been included in this EIS.

- A request was made to designate specific routes and perform route-specific risk analyses for transporting the ETTP cylinders to Portsmouth. Specific routes will not be known until the selected contractor is ready to ship the cylinders from ETTP. The exact routes will be determined on the basis of the shipment mode selected (truck or rail), applicable regulations, and other factors, as appropriate. Before the shipments occur, a transportation plan will be coordinated with the appropriate regulatory agencies. However, this EIS does present an evaluation of transportation risks for representative routes that were identified by using route prediction models for truck and rail modes.

- Requests were made to analyze the impacts associated with the use of conversion products. As described further below, no large-scale uses of the depleted uranium conversion product have been identified, and current plans assume disposal of the material. The DUF_6 PEIS (DOE 1999a) analyzed the generic impacts associated with the manufacture of waste containers using depleted uranium and depleted UO_2. Impacts associated with actual use of any depleted uranium products will be analyzed if specific uses are identified and any necessary licenses, permits, or exemptions are obtained. This EIS does evaluate impacts associated with the potential sale and use of fluoride-containing conversion products (i.e., HF and CaF_2).

1.6.2 Scope of This Environmental Impact Statement

In response to the congressional mandate to build conversion plants at the Portsmouth and Paducah sites (P.L. 107-206), DOE reevaluated the appropriate scope of its NEPA review and decided to prepare two separate site-specific EISs in parallel; one EIS for the facility proposed for the Paducah site and a second EIS for the Portsmouth site. This change in approach was announced in a *Federal Register* Notice published on April 28, 2003 (DOE 2003b).

This EIS addresses the potential environmental impacts at Portsmouth from the construction, operation, maintenance, and D&D of the proposed conversion facility; from the transportation of the ETTP cylinders to Portsmouth; from the transportation of depleted uranium conversion products to a disposal facility; and from the transportation, sale, use, or disposal of the fluoride-containing conversion products (HF or CaF_2). Three alternative locations within the Portsmouth site are evaluated for the conversion facility. An option of shipping the ETTP cylinders to Paducah for conversion is also considered. In addition, this EIS evaluates a no action alternative, which assumes continued storage of DUF_6 in cylinders at the Portsmouth and ETTP sites. Additional details are provided in the sections below.

1.6.2.1 Alternatives

The alternatives that are evaluated and compared in this EIS include a no action alternative and three action alternatives that focus on where to site the conversion facility within the Portsmouth site:

1. *No Action Alternative*. Under the no action alternative, conversion would not occur. Current cylinder management activities (handling, inspection, monitoring, and maintenance) would continue, so the status quo would be maintained at Portsmouth and ETTP indefinitely, consistent with the *UF_6 Cylinder Project Management Plan* (LMES 1997a) and the Ohio and Tennessee consent orders, which cover actions needed to meet safety and environmental requirements.

2. *Action Alternatives.* The proposed action considers the construction and operation of a conversion facility at the Portsmouth site. Three alternative locations within the site are evaluated (Locations A [preferred], B, and C, which are defined in Chapter 2). The proposed action includes the transportation of the cylinders currently stored at the ETTP site to Portsmouth. In addition, an option of transporting the ETTP cylinders to Paducah is considered, as well as an option of expanding conversion facility operations.

These alternatives and options, as well as the alternatives that were considered but not evaluated in detail, are described more fully in Chapter 2.

1.6.2.2 Depleted Uranium Conversion Technologies and Products

As noted in Section 1.1.5, DOE awarded a conversion services contract to UDS on August 29, 2002. The proposed UDS facility would convert DUF_6 to a mixture of depleted uranium oxides (primarily U_3O_8), a form suitable for disposal if uses are not identified. In addition to depleted U_3O_8, the UDS conversion facility would produce aqueous HF, which is a product that has commercial value and could potentially be sold for industrial use. The evaluation of the proposed action in this EIS is based on the proposed UDS conversion technology and facility design, which is described in Section 2.2.

The conversion project RFP did not specify the conversion product technology or form. Three proposals submitted in response to the RFP were deemed to be in the competitive range; two of these proposals involved conversion of DUF_6 to U_3O_8 and the third involved conversion to depleted UF_4. Potential environmental impacts associated with these proposals were considered during the procurement process, which involved the preparation of an environmental critique and environmental synopsis that were prepared in accordance with the requirements of 10 CFR 1021.216.

The environmental critique, which contains proprietary information, focuses on environmental issues pertinent to a decision among the proposals within the competitive range and includes a discussion of the purpose of the procurement and each offer, a discussion of the salient characteristics of each offer, and a comparative evaluation of the environmental impacts of the offers. The environmental synopsis is a summary document based on the environmental critique; it does not include proprietary information. The synopsis documents the evaluation of potential environmental impacts associated with the proposals in the competitive range and does not contain procurement-sensitive information. The environmental synopsis is presented in Appendix D.

The environmental synopsis concludes that, on the basis of the assessment of potential environmental impacts presented in the critique, no proposal was clearly environmentally preferable. Although differences in a number of impact areas were identified, none of the differences were considered to result in one proposal being preferable over the others. In addition, the potential environmental impacts associated with the proposals were found to be similar to, and generally less than, those presented in the DUF_6 PEIS (DOE 1999a) for representative conversion technologies.

1.6.2.3 Transportation Modes

This EIS considers shipping the cylinders at ETTP to Portsmouth, including DUF_6 and non-DUF_6 cylinders. This EIS considers several transportation methods for preparing the DUF_6 and non-DUF_6 cylinders and shipping them to the conversion facility. Many of the cylinders currently stored at ETTP do not meet U.S. Department of Transportation (DOT) requirements for shipment without some type of preparation first. The DUF_6 PEIS (DOE 1999a) and a separate transportation impact assessment (Biwer et al. 2001) contain detailed information on cylinder conditions, regulations, and preparation methods. As described in detail in Section 2.2.4, three

options for preparing noncompliant cylinders are considered in this EIS: (1) use of overpacks, certified to meet DOT shipping requirements, into which cylinders could be placed; (2) use of a cylinder transfer facility, in which the UF_6 contents could be transferred from noncompliant cylinders to compliant ones; and (3) obtaining an exemption from DOT allowing the cylinders to be shipped "as-is" or following repairs. This EIS also considers the transportation of conversion products to a user or disposal facility. Transportation of DUF_6 cylinders and conversion products by two modes, truck and train, are analyzed in this EIS.

1.6.2.4 Conversion Product Disposition

As noted, the products of the DUF_6 conversion process would consist of depleted U_3O_8 and HF. DOE has been working with industrial and academic researchers for several years to identify potential uses for both products. Some potential uses for depleted uranium exist or are being developed, and DOE believes that a viable market exists for the HF generated during conversion. To take advantage of these to the extent possible, DOE requested in the RFP that the bidders for conversion services investigate and propose viable uses.

Currently, there are several uses for depleted uranium, including (1) reactor fuel in breeder reactors; (2) conventional military applications, such as tank armor and armor-piercing projectiles; (3) biological shielding, which provides protection from x-rays or gamma rays; and (4) counterweights for use in aircraft applications. One characteristic of all these applications is that the amount of depleted uranium that they require is small, and existing demand can be met by depleted uranium stocks separate from the DUF_6 considered in this EIS; thus, these applications do not and are not expected to have a significant effect on the inventory of depleted uranium contained in the DOE DUF_6 inventory.

In the RFP, DOE acknowledges that uses for much of the depleted uranium may not be found, thus requiring that it be dispositioned as low-level radioactive waste (LLW). In its proposal, UDS confirmed that widescale applications of the depleted U_3O_8 conversion product are not currently available and that the material will likely require disposal. Studies conducted by ORNL for DOE indicate that both the Nevada Test Site (NTS) (a DOE facility) and Envirocare of Utah, Inc. (a commercial facility) are potential disposal facilities for depleted uranium (Croff et al. 2000a,b). These studies included reviews of the LLW acceptance programs and disposal capacities of both NTS and Envirocare of Utah, Inc. It was concluded that either facility would have the capacity needed to dispose of the U_3O_8 product from the proposed DOE DUF_6 conversion program, and that the U_3O_8 material to be sent to these facilities would likely meet each site's waste acceptance criteria. In its proposal to design, construct, and operate the DUF_6 conversion facilities, UDS provided evidence that both sites can presently accept the U_3O_8 and identified the Envirocare facility as the primary disposal site and NTS as the secondary disposal site.

Shipments of depleted U_3O_8 to a disposal facility are expected to begin shortly after conversion facility operations commence, currently planned for late 2006. The conversion facilities are being designed with a short-term storage capacity of 6 months' worth of depleted uranium conversion products. This storage capacity is being provided in order to accommodate

potential delays in disposal activities without affecting conversion operations. If a delay was to extend beyond 6 months, DOE would evaluate possible options and conduct appropriate NEPA review for those options.

This EIS evaluates the impacts from packaging, handling, and transporting depleted U_3O_8 from the conversion facility to disposal sites that would be (1) selected in a manner consistent with DOE policies and orders and (2) authorized or licensed to receive the conversion products by DOE (in conformance with DOE orders), the U.S. Nuclear Regulatory Commission (NRC; in conformance with NRC regulations), or an NRC Agreement State agency (in conformance with state laws and regulations determined to be equivalent to NRC regulations). Assessment of the impacts and risks from on-site handling and disposal at the LLW disposal facility are deferred to the disposal site's site-specific NEPA or licensing documents. DOE plans to decide the specific disposal location(s) for the depleted U_3O_8 conversion product after additional appropriate NEPA review. Accordingly, DOE will continue to evaluate its disposal options and will consider any further information or comments relevant to that decision. DOE will give a minimum 45-day notice before making the specific disposal decision and will provide any supplemental NEPA analysis for public review and comment.

In addition, UDS believes that aqueous HF generated during conversion is a valuable commercial commodity that could be readily sold for industrial use. Thus, this EIS evaluates impacts associated with HF sale and use. To account for the possibility that uses for HF will not be identified, this EIS also evaluates a contingency for the neutralization of HF to the unreactive solid CaF_2 for sale or disposal.

1.6.2.5 Human Health and Environmental Issues

This EIS evaluates and compares the potential impacts on human health and the environment at the Portsmouth site under the alternatives and options described above. In general, this EIS emphasizes those impacts that might differ under the various alternatives and those impacts that would be of special interest to the general public (such as potential radiation effects).

This EIS includes assessments of impacts on human health and safety, air, water, soil, biota, socioeconomics, cultural resources, site waste management capabilities, resource requirements, and environmental justice. Impacts judged by DOE to be of the greatest concern or public interest and to receive more detailed analysis include impacts on human health and safety, air and water, waste management capabilities, and socioeconomics. These issues are consequently treated in greater detail in this EIS.

The process of estimating environmental impacts from the conversion of DUF_6 is subject to some uncertainty because final facility designs are not yet available. In addition, the methods used to estimate impacts have uncertainties associated with their results. This EIS impact assessment was designed to ensure — through the selection of assumptions, models, and input parameters — that impacts would not be underestimated and that relative comparisons among the alternatives would be valid and meaningful. This approach was developed by uniformly

applying common assumptions to each alternative and by choosing assumptions intended to produce conservative estimates of impacts — that is, assumptions that would lead to overestimates of the expected impacts. Although uncertainty may characterize estimates of the absolute magnitude of impacts, a uniform approach to impact assessment enhances the ability to make valid comparisons among alternatives. This uniform approach was implemented in the analyses conducted for this EIS to the extent practicable.

1.6.3 Public Review of the Draft EIS

The two draft site-specific conversion facility EISs were mailed to stakeholders in late November 2003, and a notice of availability was published by the EPA in the *Federal Register* on November 28, 2003 (68 FR 66824). In addition, each EIS was also made available in its entirety on the Internet at the same time, and e-mail notification was sent to those on the project Web site mailing list. Stakeholders were encouraged to provide comments on the draft EISs during a 67-day review period, from November 28, 2003, until February 2, 2004. Comments could be submitted by calling a toll-free number, by fax, by letter, by e-mail, or through the project Web site. Comments could also be submitted at public hearings held near Portsmouth, Ohio, on January 7, 2004; Paducah, Kentucky, on January 13, 2004; and Oak Ridge, Tennessee, on January 15, 2004. The public hearings were announced on the project Web site and in local newspapers prior to the meetings.

A total of about 210 comments were received during the comment period. The comments received and DOE's responses to those comments are presented in Volume 2 of this EIS. Because of the similarities in the proposed actions and the general applicability of many of the comments to both site-specific conversion facility EISs, all comments received on the Portsmouth and Paducah EISs are included in Volume 2. In addition, all comments received were considered in the preparation of both final EISs.

Several revisions were made to the two site-specific conversion facility draft EISs on the basis of the comments received (changes are indicated by vertical lines in the right margin of the document). The vast majority of the changes were made to provide clarification and additional detail. Specific responses to each comment received on the draft EISs are presented in Volume 2 of this EIS; a summary of the most common issues raised by the reviewers and the general DOE responses to these issues are listed below.

- *Comments related to the proposed action and preferred alternative.*

  Numerous reviewers expressed support for the DOE conversion project in general and agreement with the preferred alternatives identified in the draft EISs. Reviewers stressed the importance of meeting the requirements of P.L. 107-206, as well as the consent orders that DOE has signed with each of the affected states.

  DOE appreciates support for the conversion project and is committed to complying with all applicable regulations, agreements, and orders.

- *Comments related to transportation of cylinders.*

  Several reviewers raised concerns over the safe transportation of cylinders from the ETTP site. Common themes included a preference for the use of overpacks, opposition to transporting noncompliant cylinders "as-is" under a DOT exemption, a general desire that shipments be made in a manner protective of health and safety, and questions concerning the potential use of barge transportation.

  DOE is committed to conducting all transportation activities in a manner protective of human health and safety and in compliance with all applicable regulations. A Transportation Plan will be developed for each shipping program related to the DUF_6 conversion facility project. Each Plan will be developed to address specific issues associated with the commodity being shipped, the origin and destination points, and concerns of jurisdictions transited by the shipments. In all cases, DOE-sponsored shipments will comply with all applicable State and Federal regulations and will be reflected in many of the operational decisions that will be made and presented in the Plan. The transportation regulations are designed to be protective of public health and safety during both accident and routine transportation conditions.

  To allow flexibility in planning and future operations, the transportation analysis in each EIS evaluates a range of options for cylinder preparation and transport modes. For example, all three options for shipping noncompliant cylinders, including obtaining a DOT exemption, using overpacks, and transferring the contents from noncompliant to compliant cylinders, are evaluated in the EISs, as are both truck and rail modes. Because barge transport has not been proposed as part of the current conversion facility project and for the reasons discussed in Section 2.3.5, a detailed evaluation has not been included in the final EISs. If barge transportation was proposed in the future and considered to be a reasonable option, additional NEPA review would be conducted.

- *Comments related to removal of cylinders from the ETTP site.*

  Several reviewers stressed the importance of DOE compliance with the 1999 consent order with the TDEC that requires the removal of the DUF_6 cylinders from the ETTP site or the conversion of the material by December 31, 2009.

  DOE is committed to complying with the 1999 consent order. Toward that end, the DOE contract for accelerated cleanup of the ETTP site, including removal of the DUF_6 cylinders, calls for completion of this activity by the end of FY 2008.

- *Comments related to the potential for DOE to receive additional DUF_6 cylinders from other sources.*

  Several reviewers noted that DOE may receive additional DUF_6 cylinders from other sources, including continued USEC operations, the proposed American Centrifuge Facility at the Portsmouth site, and other potential commercial enrichment facilities. Some reviewers requested that DOE design the conversion facilities to accommodate such an increase.

  At the present time, there are no plans or proposals for DOE to accept DUF_6 cylinders for conversion beyond the current inventory for which it has responsibility. However, Section 2.2.7 of the Portsmouth site-specific conversion facility EIS and Section 2.2.5 of the Paducah EIS discuss a number of possible future sources of additional DUF_6 that could require conversion. The potential environmental impacts associated with expanding plant operations (by either extending operations or increasing the throughput) to accommodate processing of additional cylinders are discussed in Section 5.2.8 of the Portsmouth EIS and Section 5.2.6 of the Paducah EIS. Because of the uncertainty associated with possible future sources of DUF_6 for which DOE could assume responsibility, there is no current proposal to increase throughputs of the conversion facilities or extend the operational period.

- *Comments related to USEC's American Centrifuge Facility.*

  Several reviewers noted the January 2004 announcement by USEC that the American Centrifuge Facility would be sited at Portsmouth, and stated that the EISs should be revised accordingly, including consideration of the facility under Portsmouth cumulative impacts.

  The two site-specific conversion facility EISs have been revised to reflect that Portsmouth has been selected as the site for the USEC American Centrifuge Facility. Although Location B is the likely site for construction of the centrifuge facility, it has been retained in the final Portsmouth conversion EIS as a siting alternative. The cumulative impacts analysis included in both the draft and final Portsmouth conversion facility EIS assumed that a new USEC centrifuge enrichment facility would be constructed and operated at the Portsmouth site (see Sections S.5.16 and 5.3.2). As stated in Sections S.5.16 and 5.3.2, the analysis assumed that such a plant would be sited at Portsmouth, that the existing DOE gas centrifuge technology would be used, and that the environmental impacts of such a facility would be similar to those outlined in a 1977 EIS for Expansion of the Portsmouth Gaseous Diffusion Plant that considered a similar action that was never completed. It should be noted that the NRC licensing activities for the proposed centrifuge enrichment plant will include preparation of an EIS that must also evaluate cumulative impacts at the Portsmouth site. The centrifuge enrichment facility cumulative impacts analysis will be based on the anticipated USEC enrichment facility design,

which does not currently exist, and will benefit from the detailed evaluation of conversion facility impacts presented in this EIS.

- *Comments related to current cylinder management.* Several reviewers raised questions and concerns about the current management of the cylinders at the three DOE storage sites.

  In response to these concerns, it has been emphasized that DOE's current cylinder management program provides for safe storage of the depleted DUF_6 cylinders. DOE is committed to the safe storage of the cylinders at each site through the implementation of the decision made in the ROD. DOE has an active cylinder management program designed to ensure the continued safety of cylinders until conversion is accomplished.

1.7 RELATIONSHIP TO OTHER NEPA REVIEWS

This site-specific DUF_6 Conversion EIS, along with the EIS prepared for the Paducah conversion facility (DOE 2004a), represents the second level of a tiered environmental review process being used to evaluate and implement DOE's DUF_6 Management Program. A "tiered" process refers to a process of first addressing higher-order decisions in a programmatic EIS (PEIS) and then conducting a more narrowly focused (project-level) environmental review. The project-level review incorporates, by reference, the programmatic analysis, as appropriate, as well as additional site-specific analyses. The DUF_6 PEIS (DOE 1999a), issued in April 1999, represents the first level of this tiered process.

DOE prepared, or is in the process of preparing, other NEPA reviews that are related to the management of DUF_6 or to the current DUF_6 storage sites. The DUF_6 PEIS includes an extensive list of reviews that were prepared before 1999; that list is not repeated here. The following related NEPA reviews were conducted after publication of the DUF_6 PEIS; these reviews are related to this EIS primarily because they evaluate activities occurring at Portsmouth or ETTP.

- *Supplement Analysis for Transportation of DOT Compliant Depleted Uranium Hexafluoride Cylinders from the East Tennessee Technology Park to the Portsmouth Gaseous Diffusion Plant in Fiscal Years 2003 through 2005* (DOE 2003d): The purpose of this supplement analysis is to provide a basis for determining whether the existing PEIS NEPA analysis and documentation would be sufficient to allow DOE to transport up to 1,700 full cylinders containing DUF_6 from its ETTP location to the Portsmouth site in FYs 2003 through 2005. All of these cylinders would be compliant with DOT regulatory requirements. Details of the proposed shipment campaign are presented in a transportation plan prepared by Bechtel Jacobs Company LLC (2003). Based on the Supplement Analysis, DOE issued an amended ROD to the PEIS concluding that the estimated impacts for the proposed shipment of up to 1,700 cylinders were less than or equal to those considered in the PEIS and

that no further NEPA documentation was required (68 FR 53603). However, this EIS considers shipment of all DUF_6 and non-DUF_6 at ETTP to Portsmouth (proposed) and Paducah (option). No shipments were made in FY 2003; it is expected that the planned shipments would occur in FY 2004 and FY 2005.

- *Draft Environmental Assessment: Reindustrialization Program at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (DOE 2001b): DOE proposes to transfer real property (i.e., underutilized, surplus, or excess Portsmouth GDP land and facilities) by lease and/or disposal (e.g., sale, donation, transfer to another federal agency, exchange) via a reindustrialization program. DOE prepared this environmental assessment (EA) to give the public information on the potential impacts that could result from the proposed transfer of land and facilities and to ensure that environmental impacts are considered in the decision-making process. This EA (1) describes the existing environment at Portsmouth relevant to potential impacts associated with the proposed action and alternatives; (2) analyzes potential environmental impacts, including those from development of a range of industrial and commercial uses; (3) identifies and characterizes cumulative impacts that could result from Portsmouth reindustrialization in relation to other ongoing or proposed activities within the surrounding area; and (4) provides DOE with environmental information to use in prescribing restrictions to protect, preserve, and enhance the human environment and natural ecosystems.

- *Environmental Assessment: Winterization Activities in Preparation for Cold Standby at the Portsmouth Gaseous Diffusion Plant, Piketon, Ohio* (DOE 2001c): DOE proposes to conduct winterization activities in preparation for cold standby of facilities at DOE's Portsmouth GDP in Piketon, Ohio. Winterization of Portsmouth was deemed necessary because DOE had decided to place the plant in cold standby and because facilities and systems had to be protected from freezing after USEC was to stop enriching uranium at Portsmouth in 2001. DOE prepared this EA to give the public information on the potential impacts that could result from the proposed action and reasonable alternatives and to ensure that potential environmental impacts would be considered in the decision-making process. This EA (1) describes the existing environment at Portsmouth relevant to potential impacts of the proposed action and alternatives; (2) analyzes potential environmental impacts; (3) identifies and characterizes cumulative impacts that could result from Portsmouth in relation to other ongoing or proposed activities within the surrounding area; and (4) provides DOE with environmental information to use in prescribing restrictions to protect, preserve, and enhance the human environment and natural ecosystems.

- *Draft Environmental Assessment Addendum for the Proposed Transfer of Parcel ED-1 to the Community Reuse Organization of East Tennessee* (DOE 2002a): In January 1996, DOE executed a lease for the Community Reuse Organization of East Tennessee (CROET) to develop an industrial/business park at the 957-acre (387-ha) Parcel ED-1 of Oak Ridge Reservation (ORR). The purpose of the DOE action was to transfer excess DOE real property in order to continue and further support economic development in the region. This proposed action is being evaluated in response to a proposal from CROET to transfer fee title for the presently leased Parcel ED-1. DOE's action is needed to help offset economic losses resulting from DOE downsizing, facility closures, and workforce restructuring. DOE also recognizes that transferring excess land for economic development purposes can benefit the federal government by reducing or eliminating landlord costs. The purpose of this EA addendum is to analyze the DOE proposal to transfer title of Parcel ED-1 to CROET.

- *Final Programmatic Environmental Assessment for the U.S. Department of Energy, Oak Ridge Operations Implementation of a Comprehensive Management Program for the Storage, Transportation, and Disposition of Potentially Re-Usable Uranium Materials* (DOE 2003c): DOE proposes to implement a comprehensive management program to safely, efficiently, and effectively manage its potentially reusable low-enriched uranium, normal uranium, and depleted uranium. Uranium materials presently located at multiple sites are to be consolidated by transporting the materials to one or several locations to facilitate disposition. Management would include the storage, transport, and ultimate disposition of these materials. This programmatic EA (PEA) addresses the proposed action to implement a long-term (more than 20 years) management plan for DOE's inventory of potentially reusable low-enriched, normal, and depleted uranium. A Finding of No Significant Impact (FONSI) was approved on October 16, 2002.

- *Environmental Assessment for Transportation of Low-Level Radioactive Waste from the Oak Ridge Reservation to Off-Site Treatment or Disposal Facilities* (DOE 2001a): DOE proposes to transport LLW from ORR for treatment or disposal at various locations in the United States. This EA for the transport of LLW was prepared in accordance with CEQ and DOE regulations and DOE orders and guidance. On the basis of the findings presented in this EA, DOE has determined that the proposed transportation of legacy and operational LLW from ORR for treatment or disposal at representative DOE sites and licensed commercial facilities located in the continental United States would not constitute a major federal action that would significantly affect the quality of the human environment within the context of NEPA. DOE concluded that preparation of an EIS was not required.

- *Final Environmental Impact Statement for Treating Transuranic (TRU)/Alpha Low-Level Waste at the Oak Ridge National Laboratory* (DOE 2000b): DOE proposes to construct, operate, and decontaminate and decommission a TRU waste treatment facility in Oak Ridge, Tennessee. The four waste types that would be treated at the proposed facility would be (1) remote-handled TRU mixed waste sludge, (2) liquid LLW associated with the sludge, (3) contact-handled TRU/alpha LLW solids, and (4) remote-handled TRU/alpha LLW solids. The mixed waste sludge and some of the solid waste contain metals regulated under the Resources Conservation and Recovery Act (RCRA) and might be classified as mixed waste. This document analyzes the potential environmental impacts associated with five alternatives: no action, the low-temperature drying alternative (preferred alternative), the vitrification alternative, the cementation alternative, and the treatment and waste storage at ORNL alternative.

- *Construction and Operation of the Spallation Neutron Source Facility* (DOE 1999d): DOE proposes to construct and operate a state-of-the-art, short-pulsed spallation neutron source composed of an ion source, a linear accelerator, a proton accumulator ring, and an experiment building containing a liquid mercury target and a suite of neutron scattering instrumentation. The proposed Spallation Neutron Source would be designed to operate at a proton beam power of 1 MW. The design would accommodate future upgrades to a peak operating power of 4 MW. This document analyzes the potential environmental impacts from the proposed action and the alternatives. The analysis assumes the facility would operate at powers of 1 and 4 MW over its lifetime. The two primary alternatives analyzed in this final EIS are the proposed action (to proceed with building the Spallation Neutron Source) and the no action alternative. The no action alternative describes the expected condition of the environment if no action was taken. Four siting alternatives for the Spallation Neutron Source are evaluated: ORNL in Oak Ridge, Tennessee (preferred alternative); Argonne National Laboratory (ANL) in Argonne, Illinois; Brookhaven National Laboratory (BNL) in Upton, New York; and Los Alamos National Laboratory (LANL) in Los Alamos, New Mexico.

- *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE 1997a): This EIS (referred to herein as the WM PEIS) evaluates the impacts of different approaches to the treatment, storage, and disposal of the existing and projected DOE inventory of certain types of waste management program wastes over the next 20 years. The WM PEIS considers radioactive low-level, high-level, TRU, and mixed wastes, as well as toxic and hazardous wastes. The amounts of wastes analyzed for treatment, storage, or disposal range from thousands to millions of cubic meters and include wastes generated at the DOE sites in Paducah, Kentucky; Portsmouth, Ohio; and Oak Ridge, Tennessee. The WM PEIS does not evaluate management of DUF_6

because that material is considered a source material, not a waste. The draft WM PEIS was issued in September 1995, and the final was issued in May 1997.

The WM PEIS considers the impacts of waste management at Paducah, Portsmouth, and ORR on the basis of the existing and projected inventories of waste generated during site operations. The three sites are also considered candidate sites for regionalized waste management sites, and waste management impacts are evaluated for these scenarios as well. Cumulative impacts of current operations, waste management, and proposed future operations are also assessed for the three sites in the WM PEIS.

1.8 OTHER DOCUMENTS AND STUDIES RELATED TO DUF_6 MANAGEMENT AND CONVERSION ACTIVITIES

In addition to the related NEPA reviews described in Section 1.7, other reports that relate to managing the DUF_6 inventory (covering conversion, transportation, characterization, and disposal activities) that were completed after the DUF_6 PEIS was published were also reviewed in preparing this EIS. A list of the reports reviewed and used as a part of the preparation for this EIS is provided here.

- *Final Plan for the Conversion of Depleted Uranium Hexafluoride as Required by Public Law 105-204* (DOE 1999b): This report is the final plan for converting DOE's DUF_6 inventory, as required by P.L. 105-204. This Conversion Plan describes the steps that would allow DOE to convert the DUF_6 inventory to a more stable chemical form. It incorporates information received from the private sector in response to DOE's request for expressions of interest; ideas from members of the affected communities, Congress, and other interested stakeholders; and the results of the analyses for the final DUF_6 PEIS. The Conversion Plan describes DOE's intent to chemically process the DUF_6 to create products that would present a lower long-term storage hazard and provide a material suitable for use or disposal.

- *U.S. Department of Energy DUF_6 Materials Use Roadmap* (DOE 2000a): This report meets the commitment presented in the Conversion Plan by providing a comprehensive roadmap that DOE will use to guide any future R&D activities for the materials associated with its DUF_6 inventory. It supports the decision presented in the ROD, namely, to begin conversion of the DUF_6 inventory to uranium oxide, uranium metal, or a combination of both as soon as possible, while allowing for future uses for as much of this inventory as possible. This roadmap is intended to explore potential uses for the DUF_6 conversion products and identify areas where further development is needed. Although it focuses on potential governmental uses of DUF_6 conversion products, it also incorporates a limited analysis of private sector

uses. This roadmap also addresses other surplus depleted uranium, primarily in the form of depleted uranium trioxide (UO_3) and depleted UF_4.

- *Depleted Uranium Hexafluoride Management Program: Data Compilation for the Portsmouth Site in Support of Site-Specific NEPA Requirements for Continued Cylinder Storage, Cylinder Preparation, Conversion, and Long-Term Storage Activities* (Hartmann 1999a): This report is a compilation of data and analyses for the Portsmouth site that were obtained and conducted to prepare the DUF_6 PEIS. The report describes the affected environment at the Portsmouth site and summarizes potential environmental impacts that could result from conducting the following DUF_6 activities at the site: continued cylinder storage, preparation of cylinders for shipment, conversion, and long-term storage.

- *Depleted Uranium Hexafluoride Management Program: Data Compilation for the K-25 Site in Support of Site-Specific NEPA Requirements for Continued Cylinder Storage and Cylinder Preparation Activities* (Hartmann 1999b): This report is a compilation of data and analyses for the ETTP site (formerly called the K-25 site) that were obtained and conducted to prepare the DUF_6 PEIS. The report describes the affected environment at the ETTP site and summarizes the potential environmental impacts that could result from continued cylinder storage and preparation of cylinders for shipment at the site.

- *Evaluation of UF_6-to-UO_2 Conversion Capability at Commercial Nuclear Fuel Fabrication Facilities* (Ranek and Monette 2001): This report examines the capabilities of existing commercial nuclear fuel fabrication facilities to convert DUF_6 to depleted UO_2. For domestic facilities, the information summarized includes currently operating capacity to convert DUF_6 to UO_2; transportation distances from DUF_6 storage locations near Oak Ridge, Portsmouth, and Paducah to the commercial conversion facilities; and regulatory requirements for nuclear fuel fabrication and transportation of DUF_6. The report concludes that current U.S. commercial nuclear fuel fabricators could convert 5,200 t (5,700 tons) of DUF_6 per year to UO_2 (which includes 666 t (734 tons) of DUF_6 per year of capacity that was scheduled for shutdown by the end of 2001). However, only about 300 t (330 tons) of DUF_6 per year of this capacity could be confirmed as being possibly available to DOE. The report also provides some limited descriptions of the capabilities of foreign fuel fabrication plants to convert DUF_6 to UO_2.

- *Assessment of Preferred Depleted Uranium Disposal Forms* (Croff et al. 2000a): This study assesses the acceptability of various potential depleted uranium conversion products for disposal at likely LLW disposal sites. The objective is to help DOE decide the preferred form for the depleted uranium conversion product and determine a path that will ensure reliable and efficient disposal. The study was conducted under the expectation that if worthwhile

beneficial uses could not be found for the converted depleted uranium product, it would be sent to an appropriate site for disposal. The depleted uranium products are considered to be LLW under both DOE orders and NRC regulations. A wide range of issues associated with disposal are discussed in the report. The report concludes that, on balance, the four potential forms of depleted uranium (uranium metal, UF_4, UO_2, and U_3O_8) considered in the study should be acceptable, with proper controls, for near-surface disposal at sites such as NTS and Envirocare.

- *Evaluation of the Acceptability of Potential Depleted Uranium Hexafluoride Conversion Products at the Envirocare Disposal Site* (Croff et al. 2000b): With regard to the Envirocare site, the earlier report (Croff et al. 2000a), concluded that "current waste acceptance criteria suggest that the acceptability of depleted uranium hexafluoride conversion material for disposal at Envirocare of Utah is questionable. Further investigation is required before a definitive determination can be made." The purpose of this report is to document the more thorough investigation suggested in the earlier report. It concludes that an amendment to the Envirocare license issued on October 5, 2000, has reduced the uncertainties associated with disposal of the depleted uranium product at Envirocare to the point that they are now comparable with uncertainties associated with the disposal of the depleted uranium product at NTS that were discussed in the earlier report.

- *Transportation Impact Assessment for Shipment of Uranium Hexafluoride (UF_6) Cylinders from the East Tennessee Technology Park to the Portsmouth and Paducah Gaseous Diffusion Plants* (Biwer et al. 2001): This report presents a transportation impact assessment for shipping the 4,683 full cylinders of DUF_6 (containing a total of approximately 56,000 t [62,000 tons]) stored at ETTP to the Portsmouth and Paducah sites for conversion. It also considers the transport of 2,394 cylinders stored at ETTP that contain a total of 25 t (28 tons) of enriched and normal uranium or that are empty. Shipments by both truck and rail are considered, with and without cylinder overpacks. In addition, the report contains an analysis of the current and pending regulatory requirements applicable to packaging UF_6 for transport by truck or rail, and it evaluates regulatory options for meeting the packaging requirements.

- *Strategy for Characterizing Transuranics and Technetium Contamination in Depleted UF_6 Cylinders* (Hightower et al. 2000): This report summarizes the results of a study performed to develop a strategy for characterizing low levels of radioactive contaminants (Pu, Np, Am, and Tc) in DUF_6 cylinders at the ETTP, Portsmouth, and Paducah sites. The principal conclusion from this review and analysis is that even without additional sampling, the current body of knowledge is sufficient to give potential conversion vendors an adequate basis for designing facilities that can operate safely. The report also provides upper-bound estimates of Pu, Np, and Tc concentrations in DUF_6 cylinders.

- *A Peer Review of the Strategy for Characterizing Transuranics and Technetium Contamination in Depleted Uranium Hexafluoride Tails Cylinders* (Brumburgh et al. 2000): This document provides the findings from a peer review of the ORNL study (Hightower et al. 2000) that set forth a strategy for characterizing low levels of radioactive contaminants in DUF_6 cylinders at the ETTP, Portsmouth, and Paducah sites. This peer review evaluates the ORNL study in three main areas: TRU chemistry/radioactivity, statistical approach, and the uranium enrichment process. It provides both general and specific observations about the general characterization strategy and its recommendations.

1.9 ORGANIZATION OF THIS ENVIRONMENTAL IMPACT STATEMENT

This DUF_6 Conversion EIS consists of two volumes. Volume 1 contains 10 chapters and 8 appendixes. Volume 2 contains the comment response document for the review of the draft EIS. Brief summaries of the main components of the EIS follow:

Volume 1 — Main Text and Appendixes:

- Chapter 1 introduces the EIS, discussing pertinent background information, the purpose of and need for the DOE action, the scope of the assessment, related NEPA reviews, other related reports and studies, and EIS organization.

- Chapter 2 defines the alternatives and implementation options considered in the EIS, defines alternatives considered but not analyzed in detail, and presents a summary comparison of the estimated environmental impacts.

- Chapter 3 discusses the environmental setting at the Portsmouth and ETTP sites.

- Chapter 4 addresses the assumptions on which this EIS and its analyses are based, defines the approaches to and methods for environmental impact assessment used in developing this EIS, and presents background information on the human health assessment.

- Chapter 5 discusses the potential environmental impacts of the alternatives. This chapter also discusses potential cumulative impacts at the Portsmouth and ETTP sites; possible mitigation of adverse impacts that are unavoidable; irreversible commitment of resources; the relationship between short-term use of the environment and long-term productivity; pollution prevention and waste minimization; and impacts from D&D activities.

- Chapter 6 identifies the major laws, regulations, and other requirements applicable to implementing the alternatives.

- Chapter 7 is an alphabetical listing of all the references cited in the EIS. All cited references are available to the public.

- Chapter 8 lists the names, education, and experience of persons who helped prepare the EIS. Also included are the subject areas for which each preparer was responsible.

- Chapter 9 presents brief definitions of the technical terminology used in the EIS.

- Chapter 10 is a subject matter index that provides the numbers of pages where important terms and concepts are discussed.

- Appendix A presents the pertinent text of P.L. 107-206, which mandates the construction of conversion facilities at the Portsmouth and Paducah sites.

- Appendix B discusses issues associated with potential TRU and Tc contamination of a portion of the DUF_6 inventory as well as PCBs contained in some cylinder coatings and describes how such contamination was addressed in this EIS.

- Appendix C summarizes the comments received during public scoping.

- Appendix D contains the environmental synopsis prepared to support the DUF_6 conversion process.

- Appendix E discusses potential uses of HF and CaF_2, the DOE-authorized release process, and impacts associated with sale and use.

- Appendix F describes the assessment methodologies used to evaluate the potential environmental impacts.

- Appendix G contains copies of consultation letters regarding the preparation of this EIS that were sent to state agencies and recognized Native American groups.

- Appendix H contains the contractor disclosure statement.

Volume 2 — Responses to Public Comments:

- Chapter 1 provides an overview of the public participation and comment process.

- Chapter 2 provides copies of the actual letters or other documents that contain comments on the draft EIS to DOE.

- Chapter 3 lists DOE responses to all comments received.